

UNIVERSITY OF NEW BRUNSWICK
JUNIOR HIGH SCHOOL MATHEMATICS COMPETITION

May 25, 1990

GRADE 9

PART A

1. It takes a child 90 seconds to climb the 60 m. length of an escalator which is not working. When in operation, the escalator lifts a passenger from bottom to top in 60 seconds. How long does it take the child to cover the 60 meters, if she walks on the moving escalator?

(A) 30 sec. (B) 36 sec. (C) 40 sec. (D) 45 sec. (E) 50 sec.

2. A pair of jeans now on sale for \$32 has been reduced by 15% of its original cost. A sweater sells at 50% of its regular price of \$14.50. How much must you pay to buy both items?

(A) \$12.05 (B) \$34.45 (C) \$39.25 (D) \$46.50

(E) None of the previous answers

3. It costs \$3 for a car and \$10 for a bus to park in a parking lot. There are 102 vehicles in the lot and altogether they paid \$418 to park. How many cars are there in the lot?

(A) 16 (B) 25 (C) 84 (D) 86 (E) None of these previous answers

4. One of the following statements is false. Which?

(A) $24^2 + 10^2 = 26^2$ (B) $61^2 - 60^2 = 11^2$ (C) $13^2 = 85^2 - 84^2$

(D) $5^2 + 3^2 = 4^2$ (E) $8.5^2 = 4^2 + 7.5^2$

5. One needs 4221 digits to number the pages of a book. How many pages does this book contain?

(A) 1108 (B) 1246 (C) 1332 (D) 1533

(E) None of the previous answers

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6. A ladder 10 m. long runs from the top of a wall to a point 6 m. out from the foot of the wall. How high is the wall?

(A) 7 m. (B) 8 m. (C) 9 m. (D) $2\sqrt{34}$ m.
(E) None of the previous answers

7. In 1988, Betty's birthday was on a cold Wednesday in January. In 1993, on what day will her birthday occur?

(A) Sunday (B) Monday (C) Tuesday (D) Wednesday
(E) Not enough information given

8. A basketball team has won 30 games of 40 played. How many of the remaining 30 games must it win to have a 80% win record for the season?

(A) 30 (B) 15 (C) 25 (D) 26 (E) 10

9. Several pennies lie flat on a table. How many can be made to touch one particular penny?

(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

10. John spent 40% of his allowance on candy, then gave 30% of the remainder to his sister. How much of his allowance does he have left?

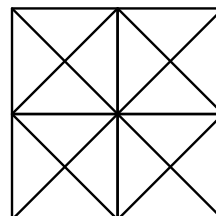
(A) 30% (B) 18% (C) 35% (D) 50% (E) 42%

PART B

11. A pole casts a shadow 15.75 m long. A man standing near the post casts a shadow 4.5 m long. If the man is 1.6 m in height, what is the height of the pole?

(A) 5.6 m (B) 8 m (C) 10 m (D) 44.3
(E) None of the previous answers

12. How many triangles are there in the following figure?



(A) 20 (B) 32 (C) 36 (D) 40 (E) 44

13. The base of a rectangle exceeds its height by 4 cm., and its perimeter is 40 cm. What is its area?

(A) 90 (B) 92 (C) 94 (D) 96 (E) 98

14. In a woodlot a forest engineer has found that 3000 trees are ready for cutting. In this woodlot 40% of the trees are conifers, and 60% are “leafy” trees. Also 62% of the leafy trees are maples, while 25% of the conifers are pines. Altogether, how many maples and pines can be cut?

(A) 1326 (B) 1416 (C) 1500 (D) 2610
(E) None of the previous answers

15. Two workers X and Y can do a job together in 4 hours. If X alone takes 6 hours to do the job, then how long will it take Y alone to do the job?

(A) 8 hr. (B) 10 hr. (C) 12 hr. (D) 14 hr.
(E) None of the previous answers

16. The edge of a sugar cube is about 1 cm. Roughly how many sugar cubes could you put in a dry, empty swimming pool which measures 25 m by 10 m by 5 m?

(A) 125,000 (B) 500,000 (C) 50,000,000 (D) 1,250,000,000 (E) 50,000,000,000

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17. Evaluate the product of the following fractions:

$$\frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{3} - \frac{1}{4}} \cdot \frac{\frac{1}{4} - \frac{1}{5}}{\frac{1}{5} - \frac{1}{6}} \cdot \frac{\frac{1}{6} - \frac{1}{7}}{\frac{1}{7} - \frac{1}{8}} \cdot \dots \cdot \frac{\frac{1}{98} - \frac{1}{99}}{\frac{1}{99} - \frac{1}{100}}$$

- (A) $\frac{1}{2}$ (B) 2 (C) 0.02 (D) 50 (E) $\frac{1}{100}$
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18. A dog runs along a path near a square garden with side length 10 m. It runs once around always staying exactly 1 m. from the edge of the garden. To the nearest meter, how far does the dog run?

- (A) 40 m (B) 44 m (C) 46 m (D) 48 m (E) 50 m.
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19. Mary buys 100 candies for \$7.00. If Yips cost \$0.05 each, Gups \$0.06 each and Pips \$0.07 each, how many more Pips than Yips did Mary buy?

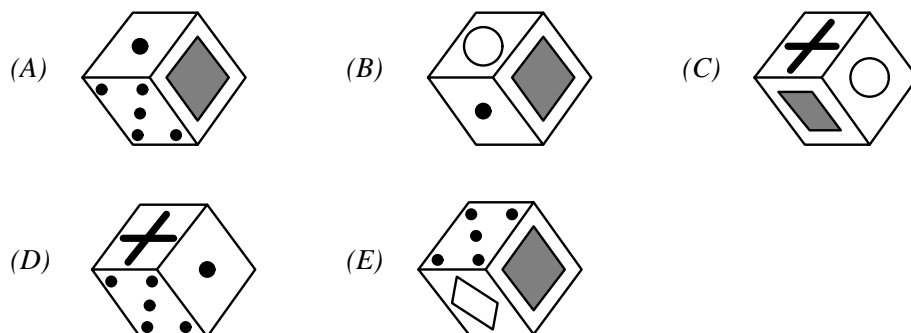
- (A) 50 (B) 60 (C) 70 (D) 100 (E) Not enough information given
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20. Suppose $a * b$ equals the sum of the digits in the product of a and b .
Thus, $4 * 7 = 10$. What is $(15 * 10) * (15 \times 10)$?

- (A) 6 (B) 150 (C) 5 (D) 10 (E) 9
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PART C

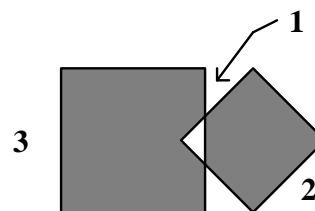
21. Just one of the following five pictures of the same cube is impossible. Which picture is impossible?



22. The average of the first 999,999 positive integers is

(A) 500,000 (B) 900,000 (C) 999,000 (D) 1,000,000 (E) 1,000,001

23. What is the difference between the areas of the shaded portions of two squares?



(A) 1 (B) 5 (C) 8 (D) 2.5 (E) Not enough information given

24. A circular race track is 3 m in width. A jogger runs around the inner circle of the track, then at the same speed around the outer circle, taking 12 sec. more to do so. How fast does the jogger run?

(A) 3π m/sec. (B) 2π m/sec. (C) $\frac{\pi}{2}$ m/sec. (D) 36π m/sec.

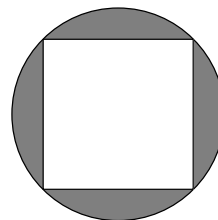
(E) Not enough information given

25. You are told that certain unknown positive integers p, q, r, s satisfy $\frac{p}{q} = \frac{r}{s}$. Which of the following statements must be true?

(A) $\frac{p}{s} = \frac{r}{q}$ (B) $\frac{p}{r} = \frac{s}{q}$ (C) $\frac{p}{q} = \frac{p+r}{q+s}$ (D) $\frac{r}{s}$ doesn't equal $\frac{r-p}{s-q}$

(E) None of (A), (B), (C), (D)

26. What fraction of the area of the circle lies outside the square?



- (A) $\frac{\pi}{2}$ (B) $\frac{2}{\pi}$ (C) $\frac{\pi - 2}{\pi}$ (D) $\frac{1}{3}$ (E) Cannot be determined from this picture
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